

May 15, 2002

Mike Szerlog, Deputy Project Officer
United States Environmental Protection Agency
1200 Sixth Avenue, Mail Stop ECL-116
Seattle, WA 98101

RE: Contract No. 68-S0-01-01, Technical Direction Document No. 02-01-0007;
Alder Gold and Copper Company Sampling and Quality Assurance Plan (SQAP)

Dear Mr. Szerlog:

Enclosed please find the final SQAP for the Alder Gold and Copper Company project located in Twisp, Washington. This version incorporates EPA comments. For this Integrated Assessment, the On-Scene Coordinator (OSC) is Sean Sheldrake, and the Task Monitor (TM) is Joanne LaBaw. Due to the abbreviated schedule to produce this document, some of the information normally included in a site assessment SQAP has not been obtained or incorporated into the SQAP. This information will be obtained prior to or during the field sampling event and incorporated into the final report.

If you have any questions or comments, please contact me at (206) 624-9537.

Sincerely,

Jeff Fowlow
START-2 Removal Project Leader

Enclosures

cc: Sharon Nickels, START-2 Project Officer, EPA, Region 10, Seattle, WA, ECL-116 (letter only)
Dhroov Shivjiani, START-2 Program Manager, E & E, Seattle, WA (letter only)
Sean Sheldrake, OSC, EPA, Region 10, Seattle, WA, ECL-116
Joanne LaBaw, TM, EPA, Region 10, Seattle, WA, ECL-115
Mark Longtine, START-2 Project Manager, E & E, Seattle, WA

**Alder Gold and Copper Company
Integrated Assessment
Sampling and Quality Assurance Plan
Twisp, Washington
TDD: 02-01-0007**

Contract: 68-S0-01-01
May 2002

Region 10
START-2

Superfund Technical Assessment and Response Team Two

Submitted To: Mike Szerlog
United States Environmental Protection Agency
1200 Sixth Avenue
Seattle, WA 98101

SAMPLING AND QUALITY ASSURANCE PLAN FOR:

**Alder Gold and Copper Company Integrated Assessment
Twisp, Washington**

TDD: 02-01-0007

Prepared By:

**Mark Woodke
Ecology and Environment, Inc.
Seattle, Washington**

Contract No: 68-S0-01-01

Date: May 2002

Key Project Personnel:

EPA On-Scene Coordinator	Sean Sheldrake, EPA, Region 10, Seattle, WA
EPA Task Monitor:	Joanne LaBaw, EPA, Region 10, Seattle, WA
START-2 Program Manager:	Dhroov Shivjiani, E & E, Seattle, WA
START-2 Project Leader:	Jeff Fowlow, E & E, Seattle, WA
START-2 Project Manager:	Mark Longtine, E & E, Seattle, WA
QA Oversight:	Mark Woodke, E & E, Seattle, WA
Data Quality Review:	Mark Woodke, E & E, Seattle, WA

APPROVALS			
Title	Name	Signature	Date
EPA On-Scene Coordinator	Sean Sheldrake		
EPA Task Monitor	Joanne LaBaw		
EPA QA Officer	Chris Pace		
START-2 Project Manager	Mark Longtine		
START-2 QA Officer	Mark Woodke		

**SAMPLING AND QUALITY ASSURANCE PLAN
ALDER GOLD AND COPPER COMPANY INTEGRATED ASSESSMENT
TWISP, WASHINGTON**

TABLE OF CONTENTS

Section Page

1.	PROJECT MANAGEMENT	1-1
1.1	PROJECT/TASK ORGANIZATION	1-1
1.1.1	Purpose	1-1
1.1.2	Roles and Responsibilities	1-1
1.1.2.1	EPA On-Scene Coordinator (OSC) and Task Monitor (TM)	1-2
1.1.2.2	EPA, Region 10, Quality Assurance Officer	1-2
1.1.2.3	EPA, Region 10, Regional Sample Control Coordinator (RSCC)	1-2
1.1.2.4	E & E START-2 Project Manager (PM)	1-2
1.1.2.5	E & E START-2 QA Officer	1-2
1.1.2.6	E & E START-2 Program Manager and EPA Project Officer	1-3
1.1.2.7	MEL or Designated CLP Laboratory	1-3
1.2	PROBLEM DEFINITION/BACKGROUND	1-3
1.2.1	Site Background	1-3
1.2.1.1	Site Location, Description and Ownership History	1-3
1.2.1.1.1	Site Location	1-3
1.2.1.1.2	Site Description/Ownership History	1-4
1.2.2	Site Operations and Source Characteristics	1-5
1.2.3	Site Area Characterization	1-5
1.2.3.1	Previous Investigations	1-5
1.2.3.2	Migration/Exposure Pathways and Targets	1-5
1.2.3.2.1	Groundwater Migration Pathway and Targets	1-5
1.2.3.2.2	Surface Water Migration Pathway	1-6
1.2.3.2.3	Soil Exposure Pathway	1-6
1.2.3.2.4	Air Migration Pathway	1-7
1.2.3.3	Areas of Potential Contamination	1-7
1.3	PROJECT/TASK DESCRIPTION AND SCHEDULE	1-8
1.3.1	Project Description	1-8
1.3.2	Schedule	1-8
1.4	QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA	1-9
1.4.1	DQO Data Categories	1-9
1.4.2	Data Quality Indicators (DQIs)	1-9
1.4.2.1	Representativeness	1-10
1.4.2.2	Comparability	1-10
1.4.2.3	Completeness	1-11
1.4.2.4	Precision	1-11
1.4.2.5	Accuracy	1-12
1.5	SPECIAL TRAINING REQUIREMENTS/CERTIFICATION	1-12
1.6	DOCUMENTATION AND RECORDS	1-12

TABLE OF CONTENTS (CONTINUED)

<u>Section</u>	<u>Page</u>
2. MEASUREMENT/DATA ACQUISITION	2-1
2.1 SAMPLING PROCESS DESIGN	2-1
2.1.1 Sample Locations	2-1
2.1.2 Global Positioning System	2-3
2.1.3 Logistics	2-3
2.1.4 Cooler Return	2-4
2.1.5 Coordination with Federal, State, and Local Authorities	2-4
2.1.6 Schedule	2-4
2.2 SAMPLING METHOD REQUIREMENTS	2-5
2.2.1 Sampling Methods	2-5
2.2.2 Sampling Equipment Decontamination	2-6
2.2.3 Investigation-Derived Wastes	2-6
2.2.4 Standard Operating Procedures	2-7
2.3 SAMPLE HANDLING AND CUSTODY REQUIREMENTS	2-7
2.3.1 Sample Identification	2-8
2.3.1.1 Sample Tags and Labels	2-8
2.3.1.2 Custody Seals	2-9
2.3.1.3 Chain-of-Custody Records and Traffic Reports	2-9
2.3.1.4 Field Logbooks and Data Forms	2-10
2.3.1.5 Photographs	2-10
2.3.2 Custody Procedures	2-11
2.3.2.1 Field Custody Procedures	2-11
2.3.2.2 Laboratory Custody Procedures	2-12
2.4 ANALYTICAL METHOD REQUIREMENTS	2-12
2.4.1 Analytical Strategy	2-12
2.4.2 Analytical Methods	2-12
2.5 QUALITY CONTROL REQUIREMENTS	2-13
2.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS	2-13
2.7 INSTRUMENT CALIBRATION AND FREQUENCY	2-14
2.8 INSPECTION/ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND CONSUMABLES	2-14
2.9 DATA ACQUISITION REQUIREMENTS (NONDIRECT MEASUREMENTS)	2-15
2.10 DATA MANAGEMENT	2-15
3. ASSESSMENT/OVERSIGHT	3-1
3.1 ASSESSMENTS AND RESPONSE ACTIONS	3-1
3.2 REPORTS TO MANAGEMENT	3-1
4. DATA VALIDATION AND USABILITY	4-1
4.1 DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS	4-1
4.1.1 Data Reduction	4-1
4.1.2 Data Validation	4-1
4.1.3 Data Assessment Procedures	4-2
4.2 DATA VERIFICATION	4-3
4.3 RECONCILIATION WITH DATA QUALITY OBJECTIVES	4-3
5. REFERENCES	5-1

LIST OF APPENDICES

- A Standard Operating Procedures
- B Supplemental Forms, Sample Documentation, and Chain-of-Custody Forms
- C EPA Region 9 Preliminary Remedial Goals

LIST OF TABLES

<u>Table</u>	<u>Page</u>
--------------	-------------

2-1	Sample Information Summary	2-16
2-2	Sample Analyses Summary	2-18
2-3	QA/QC Analytical Summary and Fixed Laboratory Analytical Methods	2-21
2-4	Sample Coding	2-24

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
---------------	-------------

1-1	Project Organization Chart	1-15
1-2	Site Vicinity Map	1-16
1-3	Site Location Map	1-17
1-4	4-Mile Map	1-18
1-5	15-Mile Map	1-19

SQAP DISTRIBUTION LIST				
Name	Organization	Title	Phone Number	Email Address
Sean Sheldrake	United States Environmental Protection Agency Seattle, Washington	On-Scene Coordinator	(206) 553-1220	sheldrake.sean@epa.gov
Joanne LaBaw	United States Environmental Protection Agency Seattle, Washington	Task Monitor	(206) 553-2594	labaw.joanne@epa.gov
Jeff Fowlow	Ecology and Environment, Inc. Seattle, Washington	START-2 Project Leader	(206) 624-9537	jfowlow@ene.com
Mark Longtine	Ecology and Environment, Inc. Seattle, Washington	START-2 Project Manager	(206) 624-9537	mlongtine@ene.com

LIST OF ACRONYMS

<u>Acronym</u>	<u>Definition</u>
Alder	Alder Gold and Copper Company
ASTM	American Society for Testing and Materials
bgs	below ground surface
CBR	California Bearing Ratio
CD-ROM	compact disk-read only memory
cfs	cubic feet per second
CLP	Contract Laboratory Program
CLPAS	Contract Laboratory Program Analytical Services
COC	chain-of-custody
DQIs	data quality indicators
DQOs	data quality objectives
E & E	Ecology and Environment, Inc.
Ecology	Washington State Department of Ecology
EDDs	electronic data deliverables
EPA	United States Environmental Protection Agency
FOWP	Field Operations Work Plan
GIS	Geographic Information Systems
GPS	Global Positioning System
HSP	Health and Safety Plan
IA	Integrated Assessment
IDWs	investigation-derived wastes
LCS	laboratory control sample
MEL	Manchester Environmental Laboratory
ug/L	micrograms per liter
OSC	On-Scene Coordinator
PE	performance evaluation
Pesticides	chlorinated pesticides
PM	project manager
PPE	probable point of entry
PRG	Preliminary Remedial Goal
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QMP	Quality Management Plan
RPD	relative percent difference
RSCC	Regional Sample Control Coordinator
SI	Site Inspection
SIS	Sample Information System
SDMS	Site Data Management System
SOPs	standard operating procedures
SOW	Statement of Work
SPLP	Synthetic Precipitate Leaching Procedure
SQAP	Sampling and Quality Assurance Plan
START	Superfund Technical Assessment and Response Team
TAL	Target Analyte List
TBD	to be determined
TDD	Technical Direction Document

LIST OF ACRONYMS (CONTINUED)

<u>Acronym</u>	<u>Definition</u>
TDS	total dissolved solids
TDL	Target Distance Limit
TM	Task Monitor
TOC	total organic carbon
TSS	total suspended solids

**SAMPLING AND QUALITY ASSURANCE PLAN
ALDER GOLD AND COPPER COMPANY INTEGRATED ASSESSMENT
TWISP, WASHINGTON**

TDD: 02-01-0007

1. PROJECT MANAGEMENT

1.1 PROJECT/TASK ORGANIZATION

This section outlines the individuals directly involved with the Alder Gold and Copper Company (Alder) Integrated Assessment (IA) sampling and their specific responsibilities. Lines of communication are shown in the Project Organization Chart (Figure 1-1).

1.1.1 Purpose

Pursuant to United States Environmental Protection Agency (EPA) Superfund Technical Assessment and Response Team (START)-2 contract No. 68-S0-01-01 and Technical Direction Document (TDD) No. 02-01-0007, Ecology and Environment, Inc. (E & E) will perform an IA at the Alder site located in Twisp, Washington. Limited sampling will be conducted at on-site and off-site locations. This Sampling and Quality Assurance Plan (SQAP) outlines the technical and analytical approaches that E & E will employ during the IA fieldwork.

This document is a combined Field Operations Work Plan (FOWP) and site-specific Quality Assurance Project Plan (QAPP) for field sampling activities. The combined FOWP/QAPP, hereafter called the SQAP, includes a brief project summary; project objectives; sampling and analytical procedures; and Quality Assurance (QA) requirements that will be used to obtain valid, representative field samples and measurements. The SQAP is intended to be combined with information presented in E & E's Quality Management Plan (QMP) for START-2, Region 10. A copy of the QMP is available in E & E's office located at 2101 4th Avenue, Suite 1900, Seattle, Washington, 98121. Standards contained in the SQAP and QMP will be used to ensure the validity of data generated by E & E for this project. A copy of the site-specific Health and Safety Plan (HSP) will be provided to each field team prior to initiation of sample collection activities and will also be maintained in E & E's Seattle office.

1.1.2 Roles and Responsibilities

The following is a list of key personnel involved in this project, along with their roles and responsibilities.

1.1.2.1 EPA On-Scene Coordinator (OSC) and Task Monitor (TM)

EPA OSC Sean Sheldrake is the overall decision maker and coordinator. The OSC and TM review and approve the site-specific SQAP and subsequent revisions in terms of project scope, objectives, and schedules. Ensures implementation of site-specific SQAP. The OSC and TM are the primary points of contact for general project problem resolution and have approving authority for the project.

1.1.2.2 EPA, Region 10, Quality Assurance Officer

The EPA QA officer is responsible for reviewing and approving the site-specific SQAP and revisions, and may also conduct assessments of field activities.

1.1.2.3 EPA, Region 10, Regional Sample Control Coordinator (RSCC)

The RSCC coordinates sample analyses performed through the EPA Contract Laboratory Program (CLP) and/or the EPA, Region 10, Manchester Environmental Laboratory (MEL) and provides sample identification numbers.

1.1.2.4 E & E START-2 Project Manager (PM)

10:START-2\02010007\S732

The START-2 PM provides overall coordination of fieldwork; provides oversight during preparation of the site-specific SQAP; implements the final approved version of the site-specific SQAP; records any deviations; serves as primary point of contact with the EPA OSC and TM; receives CLP/EPA, Region 10, laboratory information from the RSCC; serves as primary START-2 point of contact for any technical problems; and is responsible for the execution of decisions and courses of action deemed appropriate by the OSC and TM. In the absence of the START-2 PM, a START-2 alternate project manager will assume the PM's responsibilities.

1.1.2.5 E & E START-2 QA Officer

The START-2 QA officer reviews and approves the site-specific SQAP, conducts in-house audits of field operations, and is responsible for auditing and reviewing the field activities and final deliverables and proposing corrective action for nonconformities if necessary.

1.1.2.6 E & E START-2 Program Manager and EPA Project Officer

Responsible for coordinating resources requested by the EPA OSC and for the overall execution of the START-2 program.

1.1.2.7 MEL or Designated CLP Laboratory

MEL or the designated CLP laboratory will perform the analyses required for the project. A commercial laboratory will be subcontracted to perform analyses not supported by MEL or CLP. pH analysis will be performed on-site by a START chemist.

1.2 PROBLEM DEFINITION/BACKGROUND

Pursuant to EPA START-2 Contract No. 68-S0-01-01 and TDD No. 02-01-0007, E & E will perform a combined Removal Assessment/Site Inspection, known as an Integrated Assessment, at the Alder site located in Twisp, Washington. The IA will consist of limited groundwater, surface water, sediment, surface soil, and subsurface soil sample collection at potential contaminant source and target areas for site characterization and removal assessment purposes. This document outlines the technical and analytical approaches E & E will employ during IA fieldwork.

1.2.1 Site Background

Information presented in this section is based on a review of background information provided by the EPA.

1.2.1.1 Site Location, Description and Ownership History

This section includes the site location (Section 1.2.1.1.1) and a description of the facility and the history of ownership at the site (Section 1.2.1.1.2).

1.2.1.1.1 Site Location

Site Name:	Alder Mine
CERCLIS ID No.:	To be determined (TBD)
Location:	Approximately 0.4 miles south of Twisp, Washington
Latitude:	48°21'16" North
Longitude:	120°7'17" West
Legal Description:	Sections 17, 18, 19, and 20, Township 33 North, Range 22 East, Willamette Meridian
County:	Okanogan
Site Owner(s):	Alder Gold and Copper Company

1100 SW 6th Street, #1504
Portland, Oregon 97204
(503) 248-9535

Site Operator(s): Site is currently inactive
Site Contacts: Eugene Feltz
Alder Gold and Copper Company
1100 SW 6th Street, #1504
Portland, Oregon 97204
503-248-9535

1.2.1.1.2 Site Description/Ownership History

The Alder site is a former ore concentrating facility for gold and copper processing located approximately 0.4 miles south of and across the Methow River from the city of Twisp, Okanogan County, Washington (Figure 1-2). The Alder site is partially fenced with a locked gate at the main entrance road. Access is also possible by a private road with unlocked gates. There are two tailings ponds on site: a larger pond behind (southwest of) the mill building and a smaller pond northeast and below the mill building (Figure 1-3; Ecology 1986). The overall slope of the site is approximately 6 percent. Elevation at the mill site is 1,860 above mean sea level (USGS 1969). The Alder Mill operated until 1952 when operations shut down (Ecology 1986).

An intermittent stream runs along the west side of the upper tailings pond. This stream apparently serves as a source of water as no other surface water was noted flowing into the pond of water at the northern end. This stream the runs down along the (b) (6) residence and joins an irrigation raceway before flowing through the (b) (6) property. The raceway passes within 250 feet downgradient of the northeast side of the lower tailings pond. (Ecology 1986)

The site is currently owned by the Alder Gold and Copper Company of Portland, Oregon. Additional ownership and historical information relating to the site were not available during the preparation of this SQAP.

Information about the nearest residence was not obtained during preparation of this SQAP. The Methow River is located approximately 2,000 feet northeast of the site and flows toward the south-southeast.

1.2.2 Site Operations and Source Characteristics

Detailed information about site operations and source characteristics was not obtained during preparation of this SQAP. EPA analyses in 1982 showed the tailings pond sludges contained arsenic, copper, lead, silver, and zinc (Ecology 1986).

1.2.3 Site Area Characterization

This section summarizes previous investigations (Section 1.2.3.1), discusses migration/ exposure pathways and targets (Section 1.2.3.2), and describes areas of potential contamination (Section 1.2.3.3).

1.2.3.1 Previous Investigations

Previous inspections, investigations, and actions performed at the site are listed below:

- Potential Hazardous Waste Site Preliminary Assessment performed by the Washington State Department of Ecology (Ecology) in November 1984;
- Site Inspection (SI) performed by Ecology in 1986;
- Alder Mine and Mill Company Additional Action Needs and Summary Assessment Preliminary Assessment performed by Ecology in September 1992;
- Supplemental Site Inspection in 1993; and
- Phase I and Phase 2 Preliminary Assessment/Site Inspection, Alder Mine Site, performed

by START in 2000.

1.2.3.2 Migration/Exposure Pathways and Targets

This section discusses the groundwater migration, surface water migration, soil exposure, and air migration pathways and potential targets within the site's range of influence (Figures 1-4 and 1-5). At the time this SQAP was prepared, insufficient data were available to complete this section; additional details will be added for the final report.

1.2.3.2.1 Groundwater Migration Pathway and Targets

The first definitive data concerning nearby contaminated wells are contained in the Ecology 1986 SI. Samples collected from three nearby domestic wells indicated arsenic concentrations of 10, 30, and 15 micrograms per liter ($\mu\text{g/L}$).

Aquifers in the Methow Valley are located in glacial and alluvial deposits of sand and gravel; these deposits are locally as much as several hundred feet thick. Recharge to this formation is by infiltration from precipitation and irrigation and by seepage from streams. Most wells in the Methow Valley draw from this unit and yield from less than 10 to 1,000 gallons per minute. Well depths typically vary from 10 to 100 feet below ground surface (bgs). The greatest demand for groundwater from this aquifer is for agricultural purposes; however, some groundwater also is used for public supply, domestic, and commercial purposes (Whitehead 1994). In areas surrounding the Methow Valley, including the Alder Mill area, wells are completed in alluvial and/or colluvial materials, as well as underlying pre-Miocene bedrock, and typically yield small quantities of water to wells (Whitehead 1994).

1.2.3.2.2 Surface Water Migration Pathway

The site is located in an area with an average annual precipitation rate of 9.8 to 14.9 inches per year (Peplow 1999). The two-year, 24-hour rainfall event is 1.03 inches (WRCC 1999). Soils in the area are described as sandy loam to sand (Peplow 1999).

Drainage at the site flows southwest to an unnamed intermittent stream and northeast toward an intermittent irrigation raceway. Both the stream and irrigation raceway flow southeast for approximately 0.5 mile to their confluence. From there, the irrigation raceway flows approximately 8.5 miles to its end, at which point surface water appears to flow overland toward the Methow River. The 15-mile Target Distance Limit (TDL) begins at the two probable points of entry (PPE) into the intermittent stream and irrigation raceway, and continues to a point on the Methow River approximately 6 miles downstream of the apparent end of the irrigation raceway. The 15-mile TDL is illustrated in Figure 1-5.

The Methow River's average annual flow is 1,344 cubic feet per second (cfs) measured at Twisp, 9 miles upstream of the confluence of Alder Creek and the Methow River (Wiggins 1998). The Methow River is believed to be used as for recreational boating and fishing.

The Methow River is known to provide habitat for the federal-listed threatened bull trout (*Salvelinus confluentus*) and the federal-listed endangered steelhead salmon (*Oncorhynchus mykiss*) and spring-run chinook salmon (*O. tshawytscha*) (FR 1997, 1998, and 1999b). The Methow River has been proposed as critical habitat for steelhead salmon (FR 1999a). The Methow River is documented as a critical migratory pathway for steelhead salmon, spring-run chinook salmon, and bull trout (WDF&W 1999). The Methow River contains wintering habitat critical for the survival of steelhead salmon within the 15-mile TDL (Bartlett 1999).

1.2.3.2.3 Soil Exposure Pathway

Public access to the site is limited by the entrance gate, however there are indications that trespassing has occurred at the site. No people live or work at the site. The population within a 1-mile radius of the site is estimated to be 1,000 (USBC 2000). The nearest single family residence is located approximately 1,000 feet east of the site. Sensitive environment information is to be determined.

1.2.3.2.4 Air Migration Pathway

No people live or work at the site. A minimum of 1,000 people live within a 4-mile radius of the site (USCB 2000). The site is located adjacent to the Methow River, which is believed to be used for recreational boating and fishing. An unknown number of acres of wetlands are located within a 4-mile radius of the site. The 4-mile radius of the site is illustrated in Figure 1-4. The primary wind direction and speeds are unknown.

1.2.3.3 Areas of Potential Contamination

Sampling under the IA will be conducted at those areas considered potential contamination sources and at areas that may have been contaminated through the migration of hazardous substances from sources on site. Based on directions from the EPA, the following areas or features have been identified for inspection under the Alder site IA:

Potential Sources:

- \$ **Tailings Pond Soils.** Potential contaminants of concern in the area of the two tailings ponds are target analyte list (TAL) metals; surface soil and subsurface soil samples will be analyzed for TAL metals. Subsurface soil samples collected from the tailings pond will also be analyzed for synthetic precipitate leaching procedure (SPLP) metals, inorganic anions (fluoride, nitrate, nitrite, chloride, bromide, ortho-phosphate and sulfate), carbonate, bicarbonate, and total dissolved solids (TDS); soil classification; shear test; and California Bearing Ratio (CBR) geotechnical parameters.

Potential Targets:

- \$ **Domestic and Municipal Wells.** Potential contaminants of concern in the nearby groundwater are TAL metals and chlorinated pesticides (pesticides); domestic and municipal wells will be analyzed for TAL metals and pesticides. Domestic wells will also be analyzed for water characterization and engineering purposes. All domestic well samples will be analyzed for the following engineering parameters and or water characterization parameters: inorganic anions (fluoride, nitrate, nitrite, chloride, bromide, ortho-phosphate and sulfate), carbonate, bicarbonate, silica, total organic carbon (TOC), hardness, total dissolved solids (TDS), total suspended solids (TSS), pH (field analyzed) and turbidity (field analyzed). Selected domestic well samples will also be analyzed for arsenic speciation (As III and V).
- **Nearby Groundwater.** Potential contaminants of concern in the groundwater in the vicinity of the mill are TAL metals. Groundwater collected from monitoring wells will be analyzed for TAL metals, and for the following water characterization parameters: inorganic anions (fluoride, nitrate, nitrite, chloride, bromide, ortho-phosphate and sulfate), carbonate, bicarbonate, and total dissolved solids (TDS).
- \$ **Surface Water and Sediments.** Potential discharges from the Alder mill site and other possible sources may be impacting the surface water and sediments in downstream surface water bodies, including the Methow River. Potential contaminants of concern include TAL metals.
- \$ **Surface and Subsurface Soils.** Surface and subsurface soil at and in the vicinity of the Alder site may be impacted from site operations. Surface soil and subsurface soil will be sampled and analyzed for TAL metals.

1.3 PROJECT/TASK DESCRIPTION AND SCHEDULE

This section provides the project description (Section 1.3.1) and schedule (Section 1.3.2).

1.3.1 Project Description

This section defines the objectives and scope for performing the IA activities at the Alder site. The main goals for the IA activities are as follows:

- \$ Collect and analyze samples to characterize the potential sources discussed in Section 1.2.1.3.3;
- \$ Determine off-site migration of contaminants;
- \$ Determine engineering parameter information for potential water treatment systems;
- \$ Determine engineering parameter information for tailings pond materials;
- \$ Provide the EPA with adequate information to determine whether the site is eligible for placement on the National Priorities List and/or qualifies for a removal action, and
- \$ Document a threat or potential threat to public health or the environment posed by the site.

1.3.2 Schedule

The schedule for implementing the Alder IA is intended to be used as a guide. Adjustments to the implementation dates and the estimated project duration may be necessary to account for variable unforeseen or unavoidable conditions that the field team may encounter. Examples include inclement weather, difficulties in accessing a sampling location, or additional time needed to complete a task. Any significant schedule changes that arise in the field will be discussed with the OSC and TM at the earliest possible convenience. The proposed schedule of project work is as follows:

Activity	Start	Complete
Mobilize	May 19, 2002	May 19, 2002
Sample Collection Activities	May 20, 2002	May 24, 2002
Laboratory Receipt of Samples	May 21, 2002	May 25, 2002
Demobilize	May 25, 2002	May 25, 2002
Receipt of Data from EPA or CLP Laboratory (3 weeks from receipt)	June 17, 2002	June 20, 2002
Data Validation for all Laboratory Data (3 weeks from receipt)	July 8, 2002	July 11, 2002
Write Project Report (6 weeks)	July 8, 2002	August 14, 2002
Target Project Completion Date	Not Applicable	August 14, 2002

1.4 QUALITY OBJECTIVES AND CRITERIA FOR MEASUREMENT DATA

The project data quality objectives (DQOs) are to provide valid data of known and documented quality to characterize sources, determine off-site migration of contaminants, determine engineering parameter information, determine whether the site is eligible for placement on the National Priorities List, and document any threat(s) or potential threat(s) to public health or the environment posed by the site. The DQO process to be applied to this project will follow that described in the EPA (1994b) document, *Guidance for the Data Quality Objectives Process*.

1.4.1 DQO Data Categories

All samples collected under this SQAP will be analyzed using definitive analytical methods except the pH analyses which will be performed in the field. All definitive analytical methods employed for this project will be methods approved by the EPA. The data generated under this project will comply with the requirements for this data category as defined in *Data Quality Objectives Process for Superfund* (EPA 1993).

1.4.2 Data Quality Indicators (DQIs)

DQI precision, accuracy, representativeness, comparability, and completeness goals for this project were developed following guidelines presented in the EPA *Guidance for Quality Assurance Project Plans*, EPA QA/G-5 Final, Appendix D.

The basis for assessing each of the elements of data quality is discussed in the following subsections. Section 2.5 presents the QA objectives for measurement of analytical data and QC guidelines for precision and accuracy. Other DQI goals are included in the individual Standard Operating Procedures (SOPs) in Appendix A and in the Laboratory Statement of Work (SOW).

1.4.2.1 Representativeness

Representativeness is a measure of the degree to which data accurately and precisely represent a population, including a sampling point, a process condition or an environmental condition.

Representativeness is the qualitative term that should be evaluated to determine that measurements are made and physical samples collected at locations and in a manner resulting in characterizing a matrix or media. Subsequently, representativeness is used to ensure that a sampled population represents the target population and an aliquot represents a sampling unit. This SQAP will be implemented to establish representativeness for this project. Further, all sampling procedures detailed in the SQAP will be followed to ensure that the data will be representative of the media sampled. The SQAP describes the sample location, sample collection and handling techniques to avoid contamination or compromise sample integrity, and proper chain-of-custody. Additionally, the sampling design presented in the SQAP will ensure that there are a sufficient number of samples and level of confidence that analysis of these samples will detect the chemicals of concern, if present.

1.4.2.2 Comparability

Comparability is the qualitative term that expresses the measure of confidence that two data sets or batches can contribute to a common analysis and evaluation. Comparability with respect to laboratory analyses pertains to method type comparison, holding times, stability issues, and aspects of overall analytical quantitation. The following items are evaluated when assessing data comparability:

- Determining if two data sets or batches contain the same set of parameters.
- Determining if the units used for each data set are convertible to a common metric.
- Determining if similar analytical procedures and quality assurance were used to collect data for both data sets.
- Determining if the analytical instruments used for both data sets have approximately similar detection levels.
- Determining if samples within data sets were selected and collected in a similar manner.

To ensure comparability of data collected during this investigation to other data that may have been or may be collected for each property, standard collection and measurement techniques will be used.

1.4.2.3 Completeness

Completeness is calculated for the aggregation of data for each analyte measured for any particular sampling event or other defined set of samples. Completeness is calculated and reported for each method, matrix, and analyte combination. The number of valid results divided by the number of possible individual analyte results, expressed as a percentage, determines the completeness of the data set. For completeness requirements, valid results are all results not rejected through data validation. The requirement for completeness is 95% for aqueous samples and 90% for soil/sediment samples.

The following formula is used to calculate completeness:

$$\% \text{ completeness} = \frac{\text{number of valid results}}{\text{number of possible results}}$$

For any instances of samples that could not be analyzed for any reason (holding time violations in

which resampling and analysis were not possible, samples spilled or broken, etc.), the numerator of this calculation becomes the number of valid results minus the number of possible results not reported.

For this investigation, all samples are considered critical. Therefore standard collection and measurement methods will be used to achieve the completeness goal.

1.4.2.4 Precision

Precision measures the reproducibility of measurements. It is strictly defined as the degree of mutual agreement among independent measurements as the result of repeated application of the same process under similar conditions. *Analytical* precision is the measurement of the variability associated with duplicate (two) or replicate (more than two) analyses. The laboratory control sample (LCS) determines the precision of the analytical method. If the recoveries of the analytes in the LCS are within established control limits, then precision is within limits. In this case, the comparison is not between a sample and a duplicate sample analyzed in the same batch. Rather, the comparison is between the sample and samples analyzed in previous batches.

Total precision is the measurement of the variability associated with the entire sampling and analysis process. It is determined by analysis of duplicate or replicate field samples and measures variability introduced by both the laboratory and field operations. Field duplicate samples and matrix duplicate spiked samples shall be analyzed to assess field and analytical precision, and the precision measurement is determined using the relative percent difference (RPD) between the duplicate sample results.

The following formula is used to calculate precision:

$$RPD = (100) \times \frac{(S1 - S2)}{(S1 + S2)/2}$$

where:

S1 = normal sample value

S2 = duplicate sample value

1.4.2.5 Accuracy

Accuracy is a statistical measurement of correctness and includes components of random error (variability due to imprecision) and systemic error. It reflects the total error associated with a measurement. A measurement is accurate when the value reported does not differ from the true value or known concentration of the spike and standard. Analytical accuracy is measured by comparing the percent recovery of analytes spiked into an LCS to a control limit. For pesticide analyses, surrogate compound recoveries are also used to assess accuracy and method performance for each sample analyzed. Analysis of performance evaluation (PE) samples may also be used to provide additional information for assessing the accuracy of the analytical data being produced.

1.5 SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

Special training requirements or certifications are required for this project including the 40-hour Hazardous Waste Operations and Emergency Response class and annual refreshers. Health and safety procedures for E & E personnel are addressed in the E & E site-specific HSP. As previously discussed (Section 1.1.1), this document is maintained in E & E's Seattle, Washington, office and will also be provided to each field team. Included in the plan are descriptions of anticipated chemical and physical hazards, required levels of protection, health and safety monitoring requirements and action levels, personal decontamination procedures, and emergency procedures.

1.6 DOCUMENTATION AND RECORDS

This document is meant to be combined with information presented in E & E's QAPP (E & E 2001a) for the START-2, Region 10. This information is covered in this SQAP by the SOPs found in Appendix A and the CLP laboratory SOW. A copy of the START-2 QAPP is available in E & E's

Seattle, Washington, office. Standards contained in the SOPs, the START-2 QAPP, and the QMP will be used to ensure the validity of data generated by E & E for this project.

Following the completion of fieldwork and the receipt of all analytical data, an IA report summarizing project findings will be prepared by the E & E START-2 PM. Project files, including work plans, reports, analytical data packages, correspondence, chain-of-custody (COC) documentation, logbooks, corrective action forms, referenced materials, and photographs will be provided to the EPA OSC at the close of the project. Furthermore, a compact disk-read only memory (CD-ROM) containing the project photographs and reports will be provided.

E & E will assemble and fully document a digital data set including all project sampling, analysis and observation data. This digital data will be made available in a Microsoft Access format. E & E will transfer this data set and documentation to EPA, or if requested, to any other EPA contractor, and shall ensure that any data transferred is received in an uncorrupted, comprehensible and usable format. Specific data deliverable elements are presented below.

Data

A summary description of the tables, the sources of information, and other comments are provided below.

Field-Info

The field information table contains all sample collection related information. A Microsoft-Access application (Sample Information System, SIS) will be used to input and store the data. The SIS provides the user with **Asmart@data** input forms that will only allow for the entry of acceptable data field values. For each sampling event, the SIS will be updated to reflect the new samples collected. Once entered, the information will be checked and corrected where necessary. The table structure is presented below.

Field Name	Type	Size	Description
Sample-num	Character	10	Sample Number
Station	Character	10	Station Identifier
Date	Date	8	Sample Date
Time	Numeric	4	Sample Time (24 hour clock)
Sampler	Character	25	Person name
Matrix	Character	6	Sample Matrix B (i.e. soil boring, groundwater, sediment)
Water Depth	Numeric	5.1	Depth of water at sediment sample
Description	Character	40	Sample Description
Comments	Character	40	Comments

Location

The location table contains sample location coordinate information. The sample locations will be determined using Trimble Pro-XR Global Positioning System (GPS) units. E & E personnel have been trained and have utilized these units in similar projects. For each day or half-day in the field that GPS sample location data is to be collected, the GPS user will create a single file that contains the locations of each sample station. A unique station label will be entered for each sample location. This unique station identifier will be used to link the **ALocation@table** with the **AField-Info@table**. This information will be downloaded from the GPS unit and imported into the **ALocation@table** of the Site Data Management System (SDMS). All locational data for this project will be stored in decimal degrees, and will be referenced to the NAD 27 horizontal datum. Differential corrections will be made real-time. The table structure is presented below.

Field Name	Type	Size	Description
Station	Character	10	Station Identifier
X-Coord	Numeric	12.6	X-Coordinate, Decimal Degrees
Y-Coord	Numeric	12.6	Y-Coordinate, Decimal Degrees

Lab Analytical

The Lab Analytical table will hold all of the sample analysis results provided by each laboratory analyzing samples. The integrity of each data file received from the labs will be checked and verified. Once the files are received, they will be appended into the SDMS Lab Analytical table. The ASample-num@field will be used to link the ALab Analytical@table with the AField-Info@table. The table structure is presented below.

Field Name	Type	Size	Description
Sample-num	Character	10	Sample Number
Lab-id	Character	10	Laboratory Sample Identifier
Method	Character	25	Analytical Method used
L-Matrix	Character	10	Laboratory Matrix
Cas-num	Character	15	Chemical Abstracts Service (CAS) number
Analyte	Character	40	Analyte Name
Result	Numeric	12.6	Analysis result
Qual	Character	6	Sample qualifier
Quantitation-Limit	Numeric	12.6	Sample quantitation limit
Units	Character	10	Result units
Date	Date	8	Date Analyzed
Lab	Character	40	Lab name

For any Geographic Information Systems (GIS) produced maps, E & E shall provide the maps to EPA in hard copy and digital image (i.e. JPEG) formats.

2. MEASUREMENT/DATA ACQUISITION

2.1 SAMPLING PROCESS DESIGN

During the IA, samples will be collected from locations or features considered to be potential contamination sources, from selected potential hazardous substance migration pathways, and from potential targets in those pathways. The locations or features to be sampled have been determined based on information derived from a review of background information, interviews with a site representative and regulatory agencies, and direction from the EPA OSC and TM. Table 2-1 provides information regarding the sampling design and whether the measurement is considered critical or noncritical.

At the time of sampling, site-specific conditions (i.e., topography or visual evidence of contamination) will be evaluated and incorporated, when applicable, into the placement of sampling locations. Other conditions potentially contributing to deviations from the projected sampling locations include new observations or information obtained in the field that warrant an altered sampling approach, difficulty in reaching a desired soil sampling depth caused by adverse soil conditions or obstructions, or limited access to a sampling location. Significant deviations from the planned sampling locations or number of samples to be collected will be discussed with the EPA OSC and TM before implementation and will be documented on a Sample Plan Alteration form. A sample form is included in Appendix B. Every attempt will be made to collect representative samples with the equipment being used.

This section describes sample locations (Section 2.1.1); GPS (Section 2.1.2); logistics (Section 2.1.3); cooler return (Section 2.1.4); coordination with federal, state and/or local authorities (Section 2.1.5); and the proposed schedule (Section 2.1.6).

2.1.1 Sample Locations

Sample locations will be selected to achieve the objectives discussed in Section 1.3.1. All samples will be collected under the direction of the OSC and TM. All samples will be submitted for off-site fixed laboratory analysis except for turbidity and pH, which will be measured for water samples in the field.

Domestic and Municipal Wells. All groundwater samples collected from domestic and

municipal wells will be analyzed for TAL metals (Contract Laboratory Program Analytical Services [CLPAS] ILM04.1 or equivalent) and chlorinated pesticides (CLPAS OLC03.2 or equivalent). In addition, groundwater samples collected from domestic wells will be analyzed for the following engineering parameters and/or water characterization parameters: inorganic anions (fluoride, nitrate, nitrite, chloride, bromide, ortho-phosphate and sulfate - EPA Method 300), carbonate and bicarbonate (EPA Method 310.1), silica (EPA Method 370.1), TOC (EPA Method 415.1), turbidity (EPA Method 180.1), pH (EPA Method 150.1), hardness (EPA Method 130.2), TDS (EPA Method 160.1), and TSS (EPA Method 160.2). Selected groundwater samples collected from domestic wells will be analyzed for arsenic (III and V) speciation (EPA Method 1632).

Monitoring Wells. Groundwater samples will be collected from existing monitoring wells at the site, if possible, and from new monitoring wells planned as part of this field event. All groundwater samples collected from monitoring wells will be analyzed for TAL metals (Contract Laboratory Program Analytical Services [CLPAS] ILM04.1 or equivalent) and the following water characterization parameters: inorganic anions (fluoride, nitrate, nitrite, chloride, bromide, ortho-phosphate and sulfate - EPA Method 300), carbonate and bicarbonate (EPA Method 310.1), turbidity (EPA Method 180.1), pH (EPA Method 150.1), and TDS (EPA Method 160.1).

Surface Water Samples. Surface water samples will be collected from locations at surface water bodies located downstream from possible sources including the Alder Mill. All surface water samples will be analyzed for TAL metals (CLPAS ILM04.1).

Sediment Samples. Sediment samples will be collected from locations at surface water bodies located downstream from possible sources including the Alder Mill. All sediment samples will be analyzed for TAL metals (CLPAS ILM04.1).

Surface Soil Samples. Surface soil samples will be collected from the tailings ponds, the mill building, nearby residences and orchards, and a background location. In addition, if possible, surface soil samples will be collected from waste rock piles at mines located in the vicinity of Alder Mill. Soil samples will be analyzed for TAL metals (CLPAS ILM04.1).

Subsurface Soil Samples. Subsurface soil samples will be collected from soil borings installed at locations in the tailings ponds and from one background location upgradient of the tailings ponds. All subsurface soil samples will be analyzed for TAL metals (CLPAS ILM04.1). In addition, selected subsurface soil samples will also be analyzed for SPLP metals (EPA Method 1312 and 6000 and 7000 series), SPLP anions (EPA Method 1312 and Method 300), SPLP carbonate and bicarbonate (EPA Methods 1312 and 310.1), SPLP TDS (EPA Methods 1312 and 160.1), soil classification (American Society for Testing and Materials [ASTM] Method D2487), direct shear test (ASTM Method D3080), and CBR (ASTM Method D1883).

Table 2-2 presents the anticipated number and types of samples, analytical methods, specific requirements for sample container size and type, sample preservation requirements and holding times, and special handling requirements. Table 2-3 summarizes the number of QA/quality control (QC) samples to be submitted according to the method requirements.

On-site soil samples will be analyzed to determine the extent of contamination and to characterize sources of contamination, thereby satisfying the objectives of both the removal and site assessment programs. Contaminant concentrations in on-site soils will be compared to EPA Region 9 Preliminary Remedial Goals (PRGs) for Industrial Soil (Appendix C) for the determination of extent of contamination.

On-site and off-site surface soil and sediment samples will be collected using clean dedicated stainless steel spoons and bowls. All surface soil and sediment samples will be collected from 0 to 6 inches bgs. Subsurface soil samples will be collected using a hollow-stem auger or air rotary drilling rill and split-tube soil samplers. A total of approximately 8 soil borings will be advanced (including two borings within each of the two tailings ponds, one boring upgradient of each of the tailings ponds, and one boring downgradient of each of the tailings ponds). A sample will be collected below the oxidized zone at each tailings pond location. All samples will be collected in appropriate jars and descriptions of

each sample will be documented (including visual observations, odor, and organic vapor reading from field monitoring equipment). Borehole locations may be modified based on site conditions and observations and approval from the EPA OSC and TM.

2.1.2 Global Positioning System

GPS units with data loggers will be used to identify the location coordinates of every sample collected, as well as to delineate the boundaries of the potential source areas. GPS coordinates will be provided in the final IA report as an appendix. If required, the START-2 will obtain differential correction data from a local source prior to the start of the survey in order to improve the survey resolution.

2.1.3 Logistics

Sample aliquots collected for fixed laboratory analysis will be delivered to the EPA, Region 10, laboratory or an alternative laboratory as directed by EPA. Samples to be analyzed for arsenic speciation and ASTM methods will be transported to a commercial laboratory under contract to the START-2. All samples will be shipped at the end of every other day in the field by a commercial airline for express delivery. Sample control and shipping are discussed in Section 2.3.

2.1.4 Cooler Return

For laboratories other than the EPA, Region 10, laboratory, E & E will provide completed airbills accompanied by plastic envelopes with adhesive backs and address labels in the COC bags taped inside of the cooler lids so the laboratory can return the coolers to E & E. The airbills will contain the following notation: "Transportation is for the U.S. Environmental Protection Agency, and the total actual transportation charges paid to the carrier(s) by the consignor or consignee shall be reimbursed by the Government, pursuant to cost reimbursement contract No. 68-S0-01-01." This notation will enable the laboratories to return the sample coolers to E & E's warehouse. The airbills will be marked for second-day economy service and will contain the appropriate TDD number for shipment.

For the EPA, Region 10, laboratory, an arrangement by E & E for cooler return in this manner is not required.

2.1.5 Coordination with Federal, State, and Local Authorities

The START-2 will keep the OSC and TM apprised of field event progress and issues that may affect the schedule or outcome of the IA, discuss any problems encountered, inform the EPA of unusual contacts with the public or media, and obtain guidance from the EPA regarding project activities when required. Additionally, the START-2 will notify the EPA RSCC of changes to the sampling schedule for the MEL and/or CLP analyses and provide shipping information regarding every sample shipment within 24 hours of shipment or before noon on Friday for Saturday delivery.

Before initiation of the IA field activities, the START-2 will notify the property owners of the START-2's field schedule and sampling plan.

2.1.6 Schedule

The schedule for implementing the IA is intended to be used as a guide. Adjustments to the implementation dates and the estimated project duration may be necessary to account for variable unforeseen or unavoidable conditions that the field team may encounter. Examples include inclement weather, difficulties in accessing a sampling location, or additional time needed to complete a task. Significant schedule changes that arise in the field will be discussed with the OSC and TM at the earliest possible convenience.

The expected date of the IA fieldwork has not yet been determined, but is expected to commence on or about May 20, 2002. The expected 7-day field period comprises one day of mobilization, one day

of demobilization, and 5 days to complete field activities. Outdoor work will be conducted during daylight hours only.

2.2 SAMPLING METHOD REQUIREMENTS

This section describes the sampling methods (Section 2.2.1), sampling equipment decontamination (Section 2.2.2), investigation-derived wastes (IDWs; Section 2.2.3), and Standard Operating Procedures (Section 2.2.4).

2.2.1 Sampling Methods

The START-2 PM and EPA OSC and TM will be responsible for ensuring that appropriate sample collection procedures are followed and will take appropriate actions to correct any deficiencies. All samples will be maintained under COC and will be stored and shipped in iced coolers. The sampling methods for each medium are as follows:

- \$ **Surface Soil Sampling.** Surface soil samples will be collected from 0 to 6 inches below ground surface using dedicated plastic scoops or stainless steel spoons. All surface soil samples will be homogenized thoroughly in dedicated plastic or steel bowls. Guidelines for surface soil sampling are contained in the SOP found in Appendix A.
- \$ **Subsurface Soil Sampling.** Subsurface soil samples will be collected at the appropriate depths using a hollow-stem auger or air rotary drilling rig equipped with split-tube soil samplers. Subsurface soil samples will be homogenized thoroughly in dedicated plastic or steel bowls. See the associated SOPs in Appendix A.
- **Groundwater Sampling of Domestic Wells.** Domestic well samples will be collected in accordance with the SOP included in Appendix A. Samples will be collected from currently operating wells by purging each well for a minimum of fifteen minutes prior to sample collection at a sample port or other plumbed location as near the well as possible. In addition, in order to test for possible effects of piping, a first flush sample will be collected from approximately two of the wells by collecting the sample immediately after turning the spigot on.
- **Monitoring Wells.** Groundwater samples will be collected from existing monitoring wells if possible and appropriate, and from new monitoring wells installed during the planned field event. Monitoring well samples will be collected in accordance with the SOP included in Appendix A.
- \$ **Sediment Sampling.** Sediment samples will be collected from 0 to 6 inches below the surface water/sediment interface using dedicated plastic or Teflon scoops. After decanting excess water, each sediment sample will be homogenized thoroughly in dedicated plastic or Teflon bowl before being placed into prelabeled sample containers. Samples will be collected starting at the most downstream location and continuing upstream to reduce the potential of cross-contamination. Guidelines for sediment sampling are contained in the SOP found in Appendix A.
- \$ **Surface Water Sampling.** Surface water samples will be collected prior to collection of the sediment samples starting at the most downstream location following the SOP in Appendix A.

2.2.2 Sampling Equipment Decontamination

To the greatest extent possible, disposable and/or dedicated personal protective and sampling equipment will be used to avoid cross-contamination. When required, decontamination will be conducted in a central location, upwind and away from suspected contaminant sources. The following procedures (as listed in Appendix A) are to be used for all sampling equipment used to collect routine samples undergoing trace organic or inorganic constituent analyses:

1. Clean with tap water and nonphosphate detergent, using a brush if necessary to remove

- particulate matter and surface films.
- 2. Rinse thoroughly with tap water.
- 3. Rinse with 10 percent nitric acid.
- 4. Rinse thoroughly with type II reagent-grade water.
- 5. Rinse with laboratory-grade hexane.
- 6. Air dry the equipment completely.
- 7. Rinse again with type II reagent-grade water.
- 8. Remove the equipment from the decontamination area and cover with plastic. Equipment stored overnight should be wrapped in aluminum foil and covered with clean, unused plastic.

2.2.3 Investigation-Derived Wastes

The START-2 field team members will make every effort to minimize the generation of IDW throughout the field event. Attempts will be made to evaporate wastewater from decontamination operations on site. Any wastewater that cannot be evaporated will be contained in 55-gallon drums or Baker tanks, labeled, and disposed at an approved facility based on IA analytical results from groundwater and soil samples. Disposable personal protective clothing and sampling equipment generated during field activities will be rendered unusable by tearing (when appropriate), bagged in opaque plastic garbage bags, and disposed of at an approved facility, based on IA analytical results from soil and sediment samples.

2.2.4 Standard Operating Procedures

The START-2 will utilize the following SOPs (Appendix A) while performing field activities:

- \$ Field Activity Logbooks,
- \$ Geotechnical Logbook/Trip Report Preparation,
- \$ GeoprobeTM Operation,
- \$ Geologic Logging,
- \$ Borehole Installation,
- \$ Borehole Sampling,
- \$ Soil Sampling,
- \$ Sediment Sampling,
- \$ Groundwater Well Sampling,
- \$ Surface Water Sampling,
- \$ Sample Packaging and Shipping, and
- \$ Sampling Equipment Decontamination.

2.3 SAMPLE HANDLING AND CUSTODY REQUIREMENTS

This section describes sample identification and COC procedures that will be used for the Alder IA field activities. The purpose of these procedures is to ensure that the quality of samples is maintained during collection, transportation, storage, and analysis. All COC requirements comply with E & E's SOPs for sample handling. All sample control and COC procedures will follow the EPA (1991) *User's Guide to the Contract Laboratory Program*.

Examples of sample documents used for custody purposes are provided in Appendix B and include the following:

- \$ Sample identification numbers,
- \$ Sample tags or labels,
- \$ Custody seals,
- \$ COC and traffic report records,
- \$ Sample collection forms,
- \$ Analytical request forms, and

- \$ Analytical records.

During the field effort, the project manager or delegate will be responsible for maintaining an inventory of these sample documents. This inventory will be recorded in a cross-referenced matrix of the following:

- \$ Sample location,
- \$ Sample identification number,
- \$ Analyses requested and request form number(s),
- \$ COC record numbers,
- \$ Bottle lot numbers, and
- \$ Airbill numbers.

Brief descriptions of the major sample identification and documentation records and forms are provided below.

2.3.1 Sample Identification

All samples will be identified using the sample numbers assigned by the EPA RSCC. Each sample label will be affixed to the jar and covered with clear tape. A sample tracking record will be kept as each sample is collected. The following will be recorded: location, matrix, sample number, observations, and depth. In addition to the EPA-assigned sample number, samples will be tracked with a sample code system designed to allow easy reference to the sample's origin and type. The sample code key will not be provided to the laboratory. Table 2-4 summarizes the sample tracking codes and locations.

2.3.1.1 Sample Tags and Labels

Sample tags attached to or fixed around the sample container will be used to identify all samples collected in the field. The sample tags will be placed on bottles so as not to obscure any QA/QC lot numbers on the bottles, and sample information will be printed legibly. Field identification will be sufficient to enable cross-reference with the project logbook. For COC purposes, all QA/QC samples will be subject to the same custodial procedures and documentation as project samples.

To minimize handling of sample containers, labels will be completed before sample collection to the extent possible. In the field, the labels will be filled out completely using waterproof ink, then attached firmly to the sample containers and protected with clear tape. The sample label will provide the following information:

- \$ EPA Sample number,
- \$ Sample location number,
- \$ Date and time of collection,
- \$ Analysis required,
- \$ Initials of sampler, and
- \$ pH and preservation (when applicable).

2.3.1.2 Custody Seals

Custody seals are preprinted gel-type seals, designed to break into small pieces if disturbed. Sample shipping containers (e.g., coolers, drums, and cardboard boxes, as appropriate) will be sealed in as many places as necessary to ensure security. Seals will be signed and dated before use. Clear tape will be placed over the middle of the seals to ensure that they are not broken accidentally during shipment. Upon receipt of shipment at the laboratory, the custodian will check (and certify by completing the package receipt log) that seals on shipping containers are intact.

2.3.1.3 Chain-of-Custody Records and Traffic Reports

For samples to be analyzed at a CLP laboratory, the COC record and analytical traffic report forms will be completed as described in *User's Guide to Contract Laboratory Program* (EPA 1991). The

EPA's FORMS II Lite software may be used to electronically enter information for the COC and traffic report forms. The COC record and analytical traffic reports will be completed fully at least in duplicate by the field technician designated by the project manager as responsible for sample shipment to the appropriate laboratory. Information specified on the COC record will contain the same level of detail found in the project logbook, except that the on-site measurement data will not be recorded. The custody record will include the following information:

- \$ Name and company or organization of person collecting the samples;
- \$ Date samples were collected;
- \$ Type of sampling conducted (composite or grab);
- \$ Sample number (using those assigned by the EPA RSCC);
- \$ Location of sampling station (using the sample code system described in Table 2-4);
- \$ Number and type of containers shipped;
- \$ Analysis requested; and
- \$ Signature of the person relinquishing the samples to the transporter, with the date and time of transfer noted and the signature of the designated sample custodian at the receiving facility.

If samples require rapid laboratory turnaround, the person completing the COC record will note these or similar constraints in the remarks section of the custody record.

The relinquishing individual will record all shipping data (e.g., airbill number, organization, time, and date) on the original custody record, which will be transported with the samples to the laboratory and retained in the laboratory's file. Original and duplicate custody records, together with the airbill or delivery note, constitute a complete custody record. It is the project manager's responsibility to ensure that all records are consistent and that they become part of the permanent job file.

2.3.1.4 Field Logbooks and Data Forms

Field logbooks (or daily logs) and data forms are necessary to document daily activities and observations. Documentation will be sufficient to enable participants to reconstruct events that occurred during the project accurately and objectively at a later time. All daily logs will be kept in a bound notebook containing numbered pages. All entries will be made in waterproof ink, dated, and signed. No pages will be removed for any reason.

Minimum logbook content requirements are described in the E & E SOP entitled *Preparation of Field Activity Logbooks* (Appendix A). If corrections are necessary, they will be made by drawing a single line through the original entry (so that the original entry is legible) and writing the corrected entry alongside. The correction will be initialed and dated. Corrected errors may require a footnote explaining the correction.

2.3.1.5 Photographs

Photographs will be taken as directed by the team leader. Documentation of a photograph is crucial to its validity as a representation of an existing situation. The following information concerning photographs will be noted in the project or task log:

- \$ Date, time, and location where photograph was taken,
- \$ Photographer,
- \$ Weather conditions,
- \$ Description of photograph taken,
- \$ Sequential number of the photograph and the film roll number,
- \$ Camera lens system used, and
- \$ Direction.

2.3.2 Custody Procedures

The primary objective of COC procedures is to provide an accurate written or computerized record that can be used to trace the possession and handling of a sample from collection to completion of

all required analyses. A sample is in custody when it is:

- \$ In someone's physical possession,
- \$ In someone's view,
- \$ Locked up, or
- \$ Kept in a secured area that is restricted to authorized personnel.

2.3.2.1 Field Custody Procedures

The following guidance will be used to ensure proper control of samples while in the field:

- \$ As few people as possible will handle samples;
- \$ Coolers or boxes containing cleaned bottles will be sealed with a custody tape seal during transport to the field or while in storage before use. Sample bottles from unsealed coolers or boxes, or bottles that appear to have been tampered with, will not be used;
- \$ The sample collector will be responsible for the care and custody of collected samples until they are transferred to another person or dispatched properly under COC rules;
- \$ The sample collector will record sample data in the field logbook; and
- \$ The property team leader will determine whether proper custody procedures were followed during the fieldwork and will decide whether additional samples are required.

When transferring custody (i.e., releasing samples to a shipping agent), the following will apply:

- \$ The coolers in which the samples are packed will be sealed and accompanied by the COC records. When transferring samples, the individuals relinquishing and receiving them must sign, date, and note the time on the COC record. This record will document sample custody transfer;
- \$ Samples will be dispatched to the laboratory for analysis with separate COC records accompanying each shipment. Shipping containers will be sealed with custody seals for shipment to the laboratory. The COC records will be signed by the relinquishing individual, and the method of shipment, name of courier, and other pertinent information will be entered in the COC record before placement in the shipping container;
- \$ All shipments will be accompanied by COC records identifying their contents. The original custody records kept in a sealed Ziploc bag and taped inside the lid of the cooler will accompany each cooler shipment. The other copies will be distributed appropriately to the property team leader and project manager; and
- \$ If sent by common carrier, a bill of lading will be used. Freight bills and bills of lading will be retained as part of the permanent documentation.

2.3.2.2 Laboratory Custody Procedures

A designated sample custodian at the laboratory will accept custody of the shipped samples from the carrier and enter preliminary information about the package into a package or sample receipt log, including the initials of the person delivering the package and the status of the custody seals on the coolers (i.e., broken versus unbroken). The custodian responsible for sample log-in will follow the laboratory's SOP for opening the package, checking the contents, and verifying that the information on the COC agrees with samples received. The CLP or MEL and commercial laboratory will follow internal COC procedures as stated in the laboratory QA Manual.

The laboratory will check the temperature blank inside the cooler, and document it in the sample log-in form. Should the temperature be greater than what is required by the Statement of Work or the method, the sample custodian will inform the region and proceed to follow the course of actions stipulated in the SOW or specified by the regional QA Officer.

2.4 ANALYTICAL METHOD REQUIREMENTS

This section discusses the analytical strategy (Section 2.4.1) and analytical methods (Section

2.4.2).

2.4.1 Analytical Strategy

MEL or the designated CLP laboratory will perform the analyses required for the project. A commercial laboratory will be subcontracted to perform analyses not supported by MEL or CLP. pH analysis will be performed on-site by a START chemist.

The analyses to be applied to samples sent to these laboratories are listed in Table 2-2. These analyses were selected based on the probable hazardous substances used or potentially released to the environment and based on required engineering parameters.

2.4.2 Analytical Methods

EPA and/or CLP laboratory analyses will take place under a three-week turnaround time period, with validation by the EPA QA office for these analyses taking place under the standard three-week turnaround time period. Commercial laboratory analyses will take place under a four-week turnaround time period, with validation by E & E START-2 chemists for these analyses taking place under the standard one-week turnaround time period. pH analysis will be performed on-site by a START chemist. Hardcopy results from the EPA and/or CLP laboratories will be delivered to the EPA upon completion. Tables 2-1 and 2-2 provide a detailed list of sampling and analytical requirements and target DQOs for this project. Table 2-3 summarizes laboratory instrumentation and methods to be used for the IA.

2.5 QUALITY CONTROL REQUIREMENTS

QC checks for sample collection will be accomplished by a combination of COC protocols and laboratory QA as prescribed in the sampling or analytical methods. No QC samples (i.e. double blind performance evaluation samples) are planned for this activity outside normal laboratory QC criteria outlined in the analytical methods. These QC samples include rinsate and method blanks; temperature blanks; matrix spikes and duplicates; and calibration check samples. Results from these samples will be compared to the QC requirements listed in Section 4.1.2. All of the chemical analyses that will be performed for this project will produce definitive data except the field analyses. DQI targets for this project are specified in Section 1.4. Bias on estimated flagged data shall be determined by the validation process. The laboratories=DQOs for representativeness are set at 90 percent. Precision and accuracy requirements are outlined in Table 2-3.

One temperature blank consisting of a 40-milliliter glass vial of distilled water will be included in each cooler shipped to the analytical laboratories. Temperature blanks allow the laboratories to obtain a representative measurement of the temperature of samples enclosed in a cooler without disturbing the actual samples. The field team will package and label the temperature blank like a regular water sample, however the analytical laboratory will only measure the temperature of the blank. The temperature blank will not be analyzed for hazardous substances, will not be given a sample number, and will not be listed on the COC. The temperature blank will be clearly labeled: USEPA COOLER TEMPERATURE INDICATOR.

2.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

The field equipment used during this project includes an Orion pH meter and GPS units. The pH meter will be used to obtain water quality results for analyses with short holding times. Testing, inspection, and maintenance of the all field equipment will be performed in accordance with the manufacturers recommendations. Spare parts for the field equipment will be available from the manufacturer or regional representative generally within 24 hours.

All field instruments and equipment used for field laboratory analysis will be serviced and maintained only by qualified personnel. All instruments will be maintained by senior staff and/or electronics technicians. All repairs, adjustments, and calibrations will be documented in an appropriate logbook or data sheet that will be kept on file. The instrument maintenance logbooks will clearly

document the date, the description of the problems, the corrective action taken, the result, and who performed the work.

All equipment used by E & E in the field is subject to standard preventive maintenance schedules established by corporate equipment protocols. When in use, equipment will be inspected at least twice daily, once before startup in the morning and again at the end of the work shift before overnight storage or return to the charging rack. Regular maintenance, such as cleaning of lenses, replacement of in-line filters, and removal of accumulated dust, is to be conducted according to manufacturers' recommendations and in the field as needed, whichever is appropriate. All performed preventive maintenance will be entered in the individual equipment's logbook and in the field logbook.

In addition to preventive maintenance procedures, calibration checks will be performed at least once daily before equipment use and recorded in the respective logbooks. Additional calibration checks will be performed as required. All logbooks will become part of either the permanent project file or the permanent equipment file.

2.7 INSTRUMENT CALIBRATION AND FREQUENCY

All instruments and equipment used during fixed laboratory sample analyses will be operated, calibrated, and maintained according to the manufacturers' guidelines and recommendations, as well as criteria set forth in the applicable analytical methodology references and/or in accordance with the laboratory's QA Manual and SOPs.

For field instrumentation, the calibration will be performed in accordance with the manufacturers' recommendations.

2.8 INSPECTION/ACCEPTANCE REQUIREMENTS FOR SUPPLIES AND CONSUMABLES

This information is covered by the SOPs, the START-2 QAPP, and the START-2 QMP (E & E 2001b). Standards contained in these documents will be used to ensure the validity of data generated by E & E for this project. Sample jars are precleaned by the manufacturer; certification documenting this is enclosed with each box of jars. The START-2 will include this documentation as part of the project file. Nondedicated sampling equipment is demonstrated to be uncontaminated by the use of rinsate blanks.

2.9 DATA ACQUISITION REQUIREMENTS (NONDIRECT MEASUREMENTS)

No data from other sources will be used.

2.10 DATA MANAGEMENT

This document is meant to be combined with information presented in E & E's QAPP and QMP for the START-2, Region 10. Copies of the START-2 QAPP and QMP are available in E & E's Seattle, Washington, office. Standards contained in these documents will be used to ensure the validity of data generated by E & E for this project. The MEL and/or CLP laboratory will provide CLP-equivalent deliverables to the EPA validation chemist within three weeks of sample receipt. Data validation will be performed within three weeks of receipt of the data package and will consist of the deliverables as described in Section 4.1.2. Data tracking, storage, and retrieval are tracked on the TDD blue sheet, which records where the paper and electronic data are located. All paper data are stored in locked file cabinets; access to these files is restricted to key START-2 personnel. Electronic data are archived by TDD.

Table 2-1 SAMPLE INFORMATION SUMMARY ALDER GOLD AND COPPER COMPANY INTEGRATED ASSESSMENT TWISP, WASHINGTON						
Project Sampling Location	Parameter/Limits	Design Rationale	Sampling Design Assumptions	Sample Selection Procedures^a	Measurement Classification	Non-Standard Method Validation^b
Groundwater (Domestic and Municipal wells)	pH (Field Screening) / NA Turbidity / NA	Determine WQP using on-site methods	Local domestic wells are representative of groundwater conditions	Collected from residential and municipal wells	Critical for engineering purposes	Manufacturers directions and method requirements
	TAL metals / CRDL	Determine presence of hazardous substances	Local domestic and municipal wells are representative of groundwater conditions	Collected from residential and municipal wells	Critical	NA
	Anions / NA; Silica / NA; TOC / NA; TSS / NA; Hardness / NA; TDS / NA; Arsenic Speciation / NA; Pesticides / CRQL; Carbonate & Bicarbonate / NA	Determine WQP, and engineering parameters	Local domestic and municipal wells are representative of groundwater conditions	Collected from residential and municipal wells	Critical for engineering and water characterization purposes	Per Method
Groundwater (Monitoring wells)	TAL metals / CRDL	Determine the presence of hazardous substances	Residual contamination exists from past operations and has migrated to groundwater	Collected from monitoring wells	Critical	NA
	Anions / NA; TDS / NA; Carbonate & Bicarbonate / NA	Determine WQP	Local monitoring wells are representative of groundwater conditions	Collected from monitoring wells	Critical for water characterization purposes	Per Method
Surface Water	TAL metals / CRDL	Determine the presence of hazardous substances	Residual contamination exists from past operations and has migrated to surface water	Collect from nearby surface water	Critical	NA
Sediment	TAL metals / CRDL & PRGs	Determine the presence of hazardous substances	Residual contamination exists from past operations and has migrated to sediment	Collect from nearby sediment	Critical	NA
Surface soil	TAL metals / CRDL & PRGs	Determine the presence of hazardous substances	Residual contamination exists from past operations and has migrated to surface soil	Collect from mill building, tailings ponds, residences, and background locations	Critical	NA

Subsurface soil	TAL metals/CRDL & PRGs	Determine the presence of hazardous substances	Residual contamination exists from past operations and has migrated to subsurface soil	Collect from tailings ponds and background location	Critical	NA
	Geotechnical / NA SPLP (TAL metals / NA; Anions / NA; TDS / NA; Carbonate & Bicarbonate / NA)	Determine engineering parameters and characterize tailings pond leachate	Residual contamination exists from past operations and has migrated to subsurface soil	Collect from tailings ponds	Critical for engineering and leachate characterization purposes	Per method

^a Sample locations will be determined from on-site observations and historical information.

^b Data will be validated based on the laboratory statement of work QC limits and laboratory and method QC limits.

Key:

CRDL	= Contract-required detection limit.	QC	= Quality control.
Critical	= Required to achieve project objectives or limits on decision errors.	SPLP	= Synthetic precipitate leaching procedure.
CRQL	= Contract-required quantitation limit.	TAL	= Target Analyte List.
Geotechnical	= Soil Classification, Shear stress, and California Bearing Ratio.	TDS	= Total dissolved solids.
NA	= Not Applicable.	TSS	= Total suspended solids.
Pesticides	= Chlorinated pesticides.	TOC	= Total organic carbon.
PRGs	= Preliminary Remedial Goals.	WQP	= Water quality parameters.

Table 2-2 SAMPLE ANALYSES SUMMARY ALDER GOLD AND COPPER COMPANY INTEGRATED ASSESSMENT TWISP, WASHINGTON						
Location	Matrix	Number of Samples Collected ^a	Analytical Parameters and Method (or equivalent method)	Sample Preservation	Technical Holding Time ^b	Sample Container(s)
Onsite and near site Onsite and near site	Surface Soil	up to 13	Target Analyte List metals (CLPAS) ILM04.1	Cool to 4°C ± 2°C	180 days from collection (28 days for mercury)	One 8-oz wide-mouth glass jar with Teflon-lined lid
	Subsurface Soil	up to 9	Target Analyte List metals (CLPAS) ILM04.1	Cool to 4°C ± 2°C	180 days from collection (28 days for mercury)	One 8-oz wide-mouth glass jar with Teflon-lined lid
		up to 4	SPLP: Target Analyte List metals (SW-846) 1312 and 6000 and 7000 Series	Cool to 4°C ± 2°C	180 days from collection to extraction 180 days from extraction to analysis (28 days for mercury)	One 8-oz wide-mouth glass jar with Teflon-lined lid
			SPLP: Inorganic Anions / EPA Method 300	Cool to 4°C ± 2°C	48 hours from collection to analysis or 28 days from collection to analysis	One 125-mL polyethylene bottle
			SPLP: Carbonate, Bicarbonate / USGS Method	Cool to 4°C ± 2°C	TBD	TBD
			SPLP: Total Dissolved Solids / EPA Method 160.1	Cool to 4°C ± 2°C	7 days from collection to analysis	One 1-L polyethylene bottle
		2	Soil Classification / ASTM D2487	Cool to 4°C ± 2°C	TBD	TBD
		2	Shear Test / ASTM D3080	Cool to 4°C ± 2°C	TBD	TBD
		2	California Bearing Ratio / ASTM D1883	Cool to 4°C ± 2°C	TBD	TBD
	Sediment	up to 4	Target Analyte List metals (CLPAS) ILM04.1	Cool to 4°C ± 2°C	180 days from collection (28 days for mercury)	One 8-oz wide-mouth glass jar with Teflon-lined lid
	Surface Water	up to 4	Target Analyte List metals (CLPAS) ILM04.1	Cool to 4°C ± 2°C HNO ₃ to pH ≤ 2	180 days from collection (28 days for mercury)	One 1-Liter polyethylene bottle
	Groundwater (Domestic and municipal wells)	22	Target Analyte List metals (CLPAS) ILM04.1	Cool to 4°C ± 2°C; HNO ₃ to pH ≤ 2	180 days from collection (28 days for mercury)	One 1-Liter polyethylene bottle
		20	Pesticides (CLPAS) OLC03.2	Cool to 4°C ± 2°C	7 days from collection to extraction; 40 days from extraction to analysis	Two 40-mL VOA vials with Teflon-lined septa

		20	Inorganic Anions / EPA Method 300	Cool to 4°C ± 2°C	48 hours from collection to analysis or 28 days from collection to analysis	One 125-mL polyethylene bottle
		20	Carbonate, Bicarbonate / EPA Method 310.1	Cool to 4°C ± 2°C	14 days from collection to analysis	One 250-mL polyethylene bottle
		20	Silica / Method 370.1	Cool to 4°C ± 2°C	28 days from collection to analysis	One 250-mL polyethylene bottle
		20	Total Organic Carbon / EPA Method 415.1	H ₂ SO ₄ to pH ≤ 2; Cool to 4°C ± 2°C	28 days from collection to analysis	One 125-mL polyethylene bottle
		20	Turbidity / EPA Method 180.1	Cool to 4°C ± 2°C	48 hours from collection to analysis	One 125-mL polyethylene bottle
		20	pH / EPA Method 150.1	Cool to 4°C ± 2°C	Immediate	One 125-mL polyethylene bottle
		20	Hardness / EPA Method 130.2	HNO ₃ to pH ≤ 2; Cool to 4°C ± 2°C	6 months from collection to analysis	One 125-mL polyethylene bottle
		20	Total Dissolved Solids / EPA Method 160.1	Cool to 4°C ± 2°C	7 days from collection to analysis	One 1-L polyethylene bottle
		20	Total Suspended Solids / EPA Method 160.2	Cool to 4°C ± 2°C	7 days from collection to analysis	One 1-L polyethylene bottle
		3	Arsenic Speciation / EPA Method 1632	Cool to 4°C ± 2°C; HCl to pH≤2	28 days	One 1-L polyethylene bottle
	Groundwater (Monitoring wells)	up to 10	Target Analyte List metals (CLPAS) ILM04.1	Cool to 4°C ± 2°C; HNO ₃ to pH≤2	180 days from collection (28 days for mercury)	One 1-Liter polyethylene bottle
		up to 10	Inorganic Anions / EPA Method 300	Cool to 4°C ± 2°C	48 hours from collection to analysis or 28 days from collection to analysis	One 125-mL polyethylene bottle
		up to 10	Carbonate, Bicarbonate / EPA Method 310.1	Cool to 4°C ± 2°C	14 days from collection to analysis	One 250-mL polyethylene bottle
		up to 10	Total Dissolved Solids / EPA Method 160.1	Cool to 4°C ± 2°C	7 days from collection to analysis	One 1-L polyethylene bottle
a	The number of samples presented is an estimate; the actual number of samples to be collected will be determined in the field.					
b	Technical holding times have been established only for water matrices. Water technical holding times were applied to sediment and soil samples where applicable; in some cases, recommended sediment/soil holding times are listed.					
Key:						
°C		= Degrees Celsius.		mL	= Milliliter.	
CLPAS		= Contract Laboratory Program Analytical Services.		oz	= Ounce.	
EPA		= U. S. Environmental Protection Agency.		Pesticides	= Chlorinated pesticides.	
HNO ₃		= Nitric Acid.		SPLP	= Synthetic precipitate leaching procedure.	
H ₂ SO ₄		= Sulfuric Acid.		TBD	= To be determined.	
L		= Liter.				

Table 2-3										
QA/QC ANALYTICAL SUMMARY AND FIXED LABORATORY ANALYTICAL METHODS ALDER GOLD AND COPPER COMPANY INTEGRATED ASSESSMENT TWISP, WASHINGTON										
Laboratory	Matrix	Parameters (Method or equivalent)	Method Description/ Detection Limits	Total Field Samples ^a / Containers	QA/QC Sample Summary Analyses/Containers				Total Field and QA/QC Analyses/ Containers ^d	Precision and Accuracy
					Trip Blanks	Rinsate Blanks ^b	Organic MS/MSD ^c	Inorganic MS/Dup ^c		
Field Analysis	Groundwater	pH (150.1) Turbidity (EPA Method 180.1)	Electrometric/0 - 14 Nephelometric/ 0.1 NTU	20/20 20/20	NA NA	NA NA	NA NA	NA NA	20/20 20/20	NA Per Method
EPA, Region 10, or CLP Laboratory	Groundwater and Surface Water	TAL metals (CLPAS ILM04.1)	AA and ICP/CRDL	36/36	NA	2/2	NA	2/2	40/40	75%-125% +/- 35%
	Groundwater	Pesticides (CLPAS OLC03.2)	GC and ECD/CRQL	20/20	NA	1/2	1/4	NA	22/26	OLC03.2 / OLC03.2
EPA, Region 10, or Commercial Laboratory	Groundwater	Inorganic Anions (EPA Method 300)	Ion chromatography/ 0.1 to 1.0 mg/L	30/30	NA	2/2	NA	2/2	32/32	Per Method
		Carbonate and Bicarbonate (EPA Method 310.1)	TBD	30/30	NA	2/2	NA	2/2	32/32	Per Method
		Silica (Method 370.1)	Colorimetric/2 mg/L	20/20	NA	1/1	NA	1/1	22/22	Per Method
		Total Organic Carbon (EPA Method 415.1)	Combustion/2 mg/L	20/20	NA	1/1	1/1	NA	22/22	Per Method
		Hardness (EPA Method 130.2)	Titrimetric/0.1 mg/L	20/20	NA	1/1	NA	1/1	22/22	Per Method
		Total Dissolved Solids (EPA Method 160.1)	Weight/20 mg/L	30/30	NA	NA	NA	NA	30/30	Per Method
		Total Suspended Solids (EPA Method 160.2)	Weight/10 mg/L	20/20	NA	NA	NA	NA	20/20	Per Method

		Arsenic Speciation (EPA Method 1632)	GC & AA/0.003 ug/L	3/3	NA	1/1	NA	1/1	5/5	Per Method
EPA, Region 10, or CLP Laboratory	Surface Soil and Sediment	Target Analyte List metals (CLPAS ILM04.1)	AA and ICP/CRDL	17/17	NA	2/2	NA	2/0	21/18	ILM04.1/ ILM04.1
EPA, Region 10, or Commercial Laboratory	Subsurface Soil	SPLP [Target Analyte List metals (EPA 1312/6000/7000 Series); Inorganic anions (EPA Method 300); carbonate and bicarbonate (EPA Method 310.1); TDS (EPA Method 160.1)]	AA and ICP/1 mg/L Ion chromatography/ 0.1 to 1.0 mg/L TBD / TBD Weight/20 mg/L	4/4	NA	1/1	NA	1/0	6/5	Per Method
		Target Analyte List metals (CLPAS ILM04.1)	AA and ICP/CRDL	9/9	NA	1/1	NA	1/0	11/10	ILM04.1/ ILM04.1
		Soil Classification (ASTM D-2487)	Descriptive/NA	2/2	NA	NA	NA	NA	2/2	NA
		Direct Shear Test (ASTM D-3080)	Stress/NA	2/2	NA	NA	NA	NA	2/2	NA
		California Bearing Ratio (ASTM D-1883)	Strength/NA	2/2	NA	NA	NA	NA	2/2	NA
a	The total number of field samples is estimated.									
b	The total number of rinsate blanks could vary depending on the total number of sample shipments. The sample numbers are based on one rinsate per 20 samples per nondedicated sampling device. Note that rinsate blanks consist of water aliquots for both soil and water field samples.									
c	No extra volume is required for soil/sediment samples; for water samples, triple volume is required for organic analyses and double volume is required for inorganic analyses. Sample numbers are based on one MS/MSD per 20 samples per matrix.									
d	Total analyses and containers includes field and QA/QC aliquots to be submitted for fixed laboratory analysis. Note that rinsate blanks consist of water aliquots for both soil and water field samples.									
e	Includes duplicate, MS/MSD, and field blank samples.									
Key:										
AA	= Atomic absorption furnace technique.									
CLPAS	= Contract Laboratory Program Analytical Services.									
CRDL	= Contract-required detection limit.									
CRQL	= Contract-required quantitation limit.									
ECD	= Electron capture detection.									
EPA	= United States Environmental Protection Agency.									
GC	= Gas chromatography.									
ICP	= Inductively coupled argon plasma.									
ug/L	= micrograms per Liter.									
	ug/L	= micrograms per Liter.								
	mg/L	= milligrams per Liter.								
	MS/DUP	= Matrix spike/duplicate								
	MS/MSD	= Matrix spike/matrix spike duplicate.								
	NA	= Not applicable.								
	NTU	= Nephelometric turbidity units.								
	QA/QC	= Quality assurance/quality control								
	TAL	= Target Analyte List.								

Table 2-4			
SAMPLE CODING			
ALDER GOLD AND COPPER COMPANY INTEGRATED ASSESSMENT			
TWISP, WASHINGTON			
Digits	Descriptions	Code	Example
1,2	Source Code	BG DW GB MW TB D TP	Background Domestic Well Geoprobe Boring Monitoring Well To Be Determined Tailings Pond
3,4	Sample Number	01	01
5,6	Matrix Code	DW GW RS SD SB	Drinking Water Groundwater Rinsate Sediment Subsurface Soil

		SS	Surface Soil
		SW	Surface Water
		TP	Tailings pond

10:START-2\02010007\S732

3. ASSESSMENT/OVERSIGHT

3.1 ASSESSMENTS AND RESPONSE ACTIONS

The EPA QA officer or designee may conduct an audit of the field activities for this project. The auditor will have the authority to issue a stop-work order upon finding a significant condition that would adversely affect the quality and usability of the data. The EPA OSC will have the responsibility for initiating and implementing response actions associated with findings identified during the project audit. The actions taken also may involve the EPA project officer, contracting officer, and/or QA officer. Once the response actions are implemented, the EPA QA officer or designee may perform a follow-up audit to verify and document that the response actions were implemented effectively. In-house audits performed by the START-2 may be conducted in accordance with the E & E (2001b) START-2 QMP. No audits are planned for the Alder IA.

3.2 REPORTS TO MANAGEMENT

10:START-2\02010007\S732

The START-2 PM will debrief the EPA OSC and TM daily. Laboratory deliverables will be as specified in the CLP Organic (OLC03.2) and Inorganic Statements of Work (ILM04.1) or equivalent for CLP and/or MEL data and as specified in the laboratory subcontract bid specification package for commercial laboratory analyses. Once the project is complete and the resulting data is obtained, the START-2 PM will assist in the preparation of a final project report. The report will include a summary of the activities performed during the project and the resulting data (along with any statements concerning data quality). The report will be approved by the EPA OSC and TM prior to forwarding to the individuals identified in the data distribution list located in the Table of Contents section of this SQAP.

4. DATA VALIDATION AND USABILITY

4.1 DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

The validation review of data packages will include an evaluation of the information provided on the analytical data sheets and required support documentation for all sample analyses; the supporting sample collection documentation, including COC; and field instrument calibration, results, and/or performance check documentation (if required by the method). The QA review also will examine adherence to the procedures as described in the cited SOPs and the specified analytical methods in the SQAP.

4.1.1 Data Reduction

Data reduction includes all processes that change the numerical value of the raw data. Field screening data will be reported without reduction. All fixed-laboratory data reduction will be performed in accordance with the appropriate methodology and will be presented as sample results.

4.1.2 Data Validation

Field screening data will be examined for adherence to applicable SOPs and the manufacturers directions and will not be validated. Analytical data generated through the CLP contract will be validated by the Region 10 QA Office or its designee. Data generated by MEL will be validated by MEL personnel or its designee. Both MEL and CLP data validations will be performed on a regular three-week turn around time which begins upon receipt of the complete analytical data package from the laboratory. Validation of data generated by a subcontracted laboratory will be performed by E & E and will examine adherence to the QC criteria outlined in the specific analytical methods. All of the data validations will be performed in accordance with the QA/QC requirements specified in the SQAP, the technical specifications of the analytical methods and the following documents:

- \$ *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 1994a); and
- \$ *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA 1999).

Validation deliverables will include a QA memo discussing QA conformance and deviations issues which may have affected the quality of the data. Data usability, bases of application of qualifiers

and percentage of qualified data will also be discussed in the QA memoranda. Forms I (analysis Data Sheet) with the applied validation qualifiers and bias determination for estimated-qualified values will also be a part of the validation deliverables. The following qualifiers shall be used in data validation:

- \$ U = The compound was analyzed for, but not detected.
- \$ UJ = The compound was analyzed for, but was not detected; the associated quantitation limit is an estimate because quality control criteria were not met.
- \$ J = The analyte was positively identified, but the associated numerical value is an estimated quantity because quality control criteria were not met or because concentrations reported are less than the quantitation limit or lowest calibration standard.
- \$ NJ = The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- \$ R = Quality control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis are necessary for verification.
- \$ B = Detected concentration is below the method reporting limit/contract-required

		detection limit, but is above the instrument detection limit;
\$	H =	High bias
\$	K =	Unknown bias
\$	L =	Low bias
\$	Q =	Detected concentration is below the method reporting limit/contract-required quantitation limit, but is above the method detection limit.

In the absence of specific guidance, method-, laboratory-, and SQAP-specific criteria will be used for validation.

4.1.3 Data Assessment Procedures

Following data validation and reporting, all project-generated and -compiled data and information will be reconciled with the objectives specified in Section 1.3.1 to assess the overall success of Alder IA activities. This data assessment, including points of achievement and any departure from project-specific objectives, will be discussed in the QA section of the Alder IA report.

4.2 DATA VERIFICATION

Data validation deliverables will be submitted to E & E for verification. Using the QA memo,

the Forms I with validation qualifiers, and the electronic data deliverables (EDDs) from the laboratories, E & E will ensure that consistency exists among the three documents. E & E will ensure that the correct validation and bias qualifiers are applied to the affected values on the Forms I and EDDs as specified on the QA memo submitted by the validator.

4.3 RECONCILIATION WITH DATA QUALITY OBJECTIVES

The data quality indicators' target for this project is discussed in Section 1.4 of this SQAP. The data validation process will be used as a tool to determine if these targets were met. Also, using the compiled data, E & E and the EPA OSC and TM will determine the variability and soundness of the data and the data gaps that will need to be filled to meet the objectives of the project. A summary and interpretation of the analytical data will be included in the IA report.

5. REFERENCES

- Bartlett, Heather, WDF&W; August 5, 1999; A Priority Habitats in Alder Creek and the Methow River, @ telephone conversation with David Brown, Ecology and Environment, Inc.
- Ecology and Environment, Inc. (E & E), 2001a, *Region 10 START-2 Quality Assurance Project Plan*, United States Environmental Protection Agency, Contract No. 68-S0-01-01, Seattle, Washington.
- CCC, 2001b, *Region 10 START-2 Quality Management Plan*, United States Environmental Protection Agency, Contract No. 68-S0-01-01, Seattle, Washington.
- CCC, 2000, *Alder Mine Site, Phase 1 and Phase 2 Preliminary Assessment/Site Inspection Report*.
- Federal Register (FR), Volume 64, Number 56, March 24, 1999a.
- CCC, Volume 64, Number 24, February 5, 1999b.
- CCC, Volume 63, Number 111, June 10, 1998.
- CCC, Volume 62, Number 159, August 18, 1997.
- Peplow, Dan, and Edmonds, Robert; University of Washington, College of Forest Resources, Ecosystem Science Division, May 1999, *Effects of Alder Mine on the Water, Sediments and Benthic*

Macroinvertebrates of Alder Creek.

United States Census Bureau (USCB), Census 2000, Twisp, Washington population.

United States Environmental Protection Agency (EPA), 1999, *Contract Laboratory Program National Functional Guidelines for Organic Data Review*.

CCC, February 1994a, *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*.

CCC, September 1994b, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, Office of Research and Development, Washington, D.C., EPA/600/R-96/055.

CCC, September 1993, *Data Quality Objectives Process for Superfund, Interim Final Guidance*, EPA 540-R-93-071.

CCC, January 1991, *User's Guide to the Contract Laboratory Program*, 9240.0-1D.

United States Geological Survey (USGS), 1969, Twisp East topographic map.

Washington State Department of Ecology (Ecology), September 1992, *Alder Mine and Mill Company Additional Action Needs and Summary Assessment Preliminary Assessment*.

CCC, 1986, *Site Inspection Report*.

CCC, November 1984, *Potential Hazardous Waste Site Preliminary Assessment*.

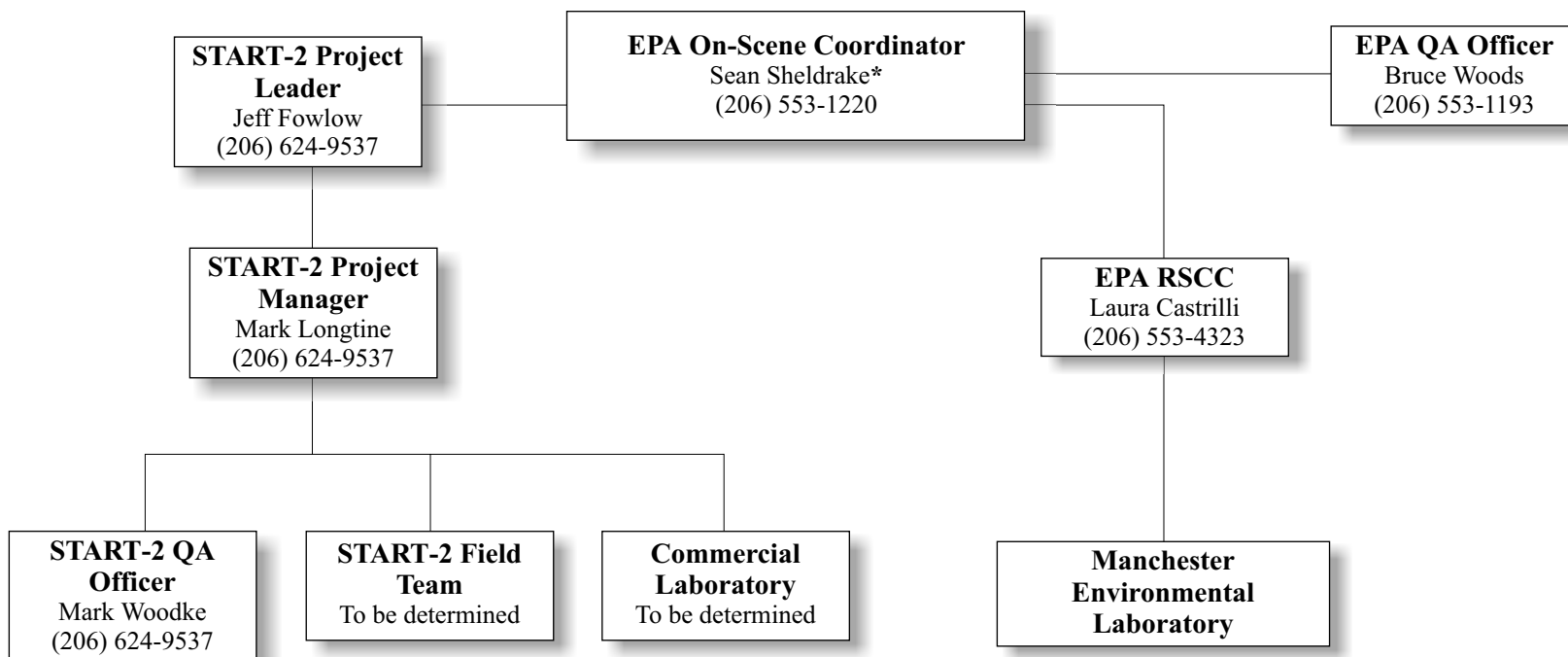
Washington Department of Fish and Wildlife (WDF&W), 1999, Priority Habitats and Species Database

and Wildlife Heritage Database

Western Regional Climate Center (WRCC), September 23, 1999, telephone conversation with David Brown, Ecology and Environment, Inc., regarding precipitation values.

Whitehead, R. L., USGS, 1994, *Groundwater Atlas of the United States, Segment 7, Idaho, Oregon, Washington*.

Wiggins, W. D., Ruppert G. P., et. al, *Water Resources Data-Washington-Water Year 1998, USGS Water Data Report WA-981*.



KEY: _____

* Approving Authority



ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

ALDER GOLD AND COPPER CO.
MILL SITE
Twisp, Washington

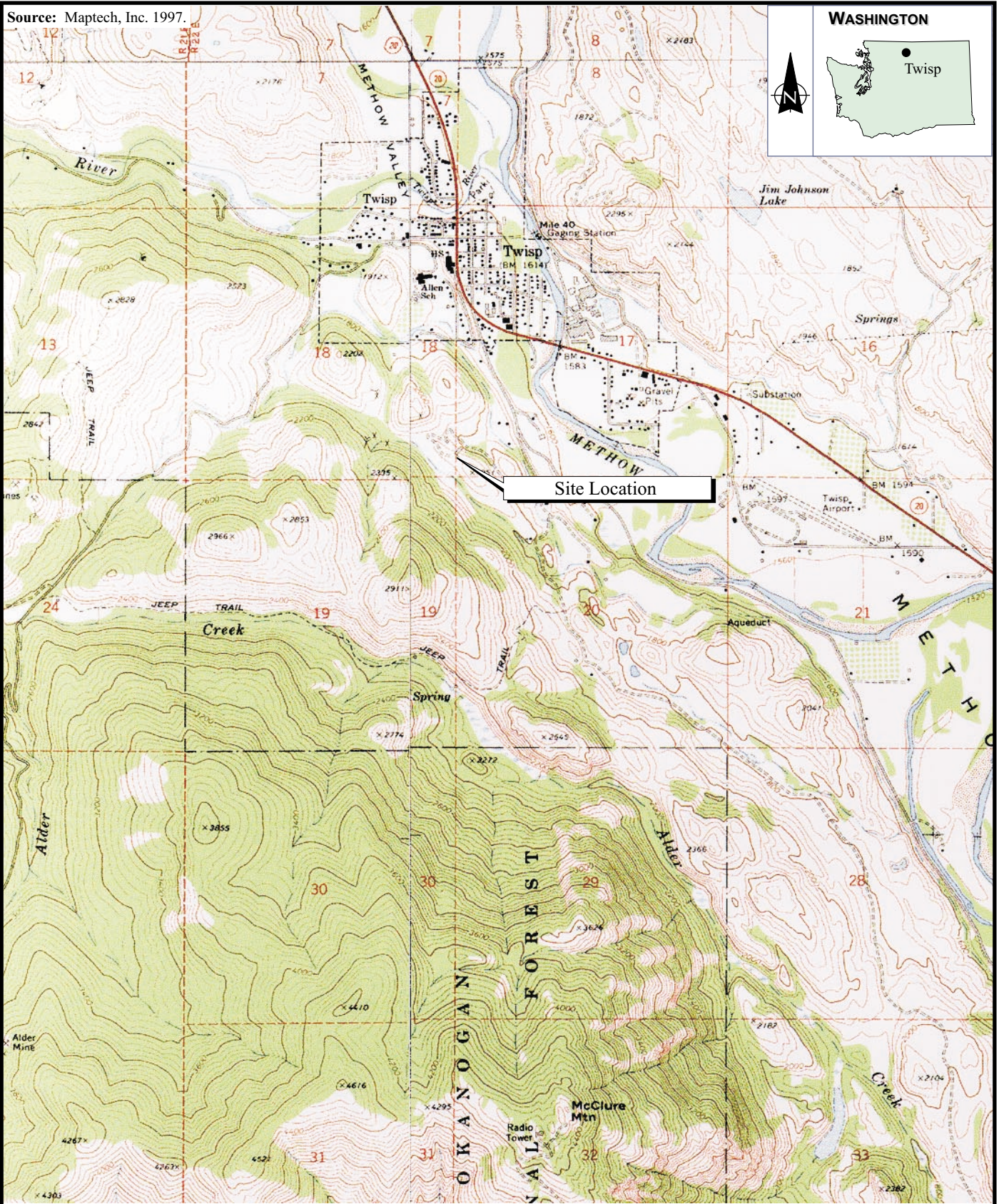
Figure 1-1
PROJECT ORGANIZATION CHART

Date:
4/15/02

Drawn by:
AES

10:START-2\02010007\S732\fig 1-1

Source: Maptech, Inc. 1997.



ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

ALDER GOLD AND COPPER CO.
MILL SITE
Twisp, Washington

0 1333 2666
Approximate Scale in Feet

Figure 1-2
SITE VICINITY MAP

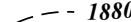


Date:
4-3-02

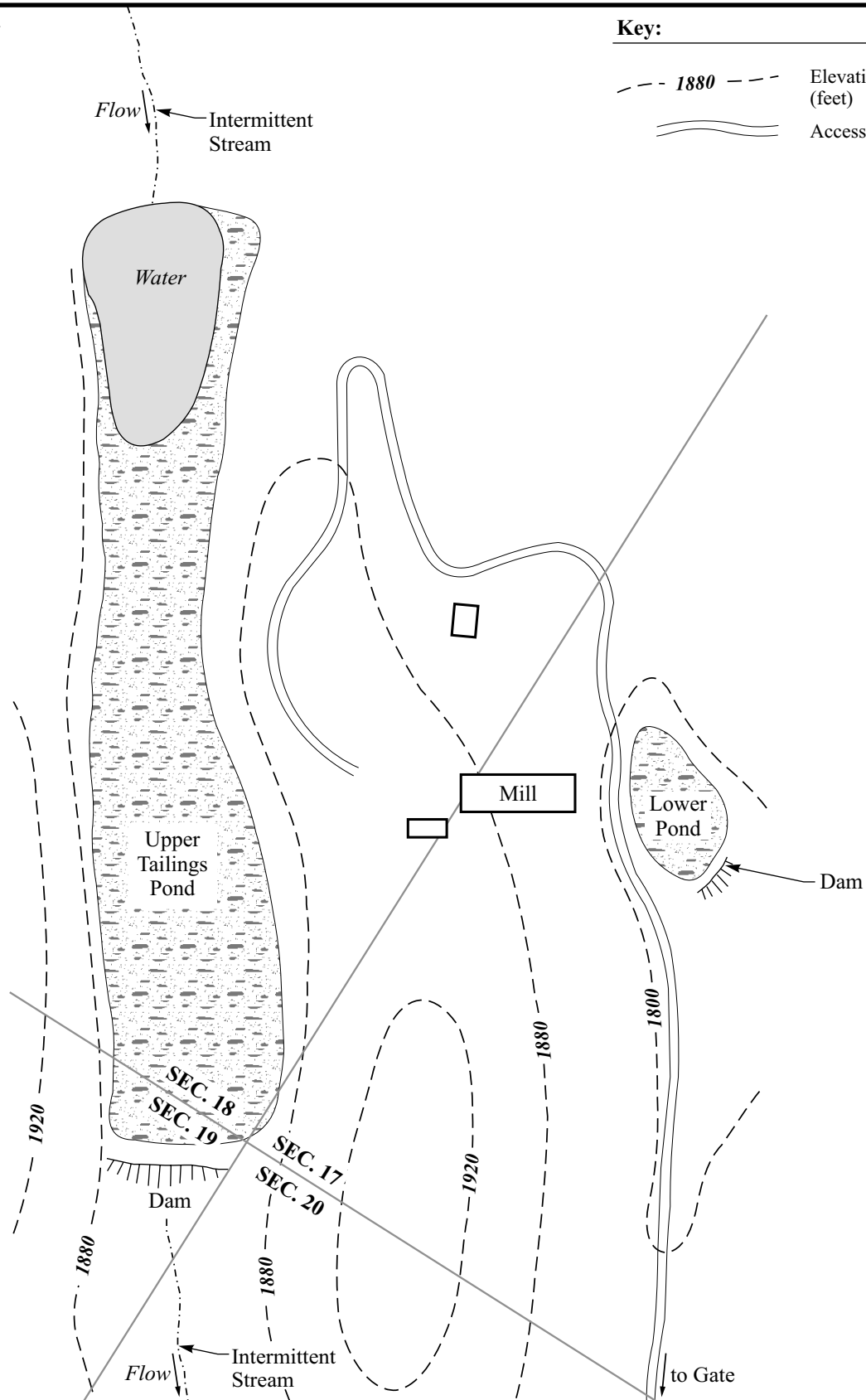
Drawn by:
AES

10:START-2\02010007\S732\fig 1-2

Source: WDOE 1986.

Key:

-  1880  Elevation Contour (feet)
-  Access Road



ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

ALDER GOLD AND COPPER CO.
MILL SITE
Twisp, Washington

0 100 200
Approximate Scale in Feet

Figure 1-3

SITE LOCATION MAP

Date:
5-10-02

Drawn by:
AES

10:START-2\02010007\S732\fig 1-3

Source: Maptech, Inc. 1997.



ecology and environment, inc.
International Specialists in the Environment
Seattle, Washington

ALDER GOLD AND COPPER CO.
MILL SITE
Twisp, Washington

0 0.75 1.5
Approximate Scale in Miles

Figure 1-4

4-MILE MAP

Date:
4-3-02

Drawn by:
AES

10:START-2\02010007\S732\fig 1-4

Source: Maptech, Inc. 1997.



APPENDIX A
STANDARD OPERATING PROCEDURES

10:START-2\02010007\S732

APPENDIX B
SUPPLEMENTAL FORMS, SAMPLE DOCUMENTATION,
AND CHAIN-OF-CUSTODY FORMS

10:START-2\02010007\S732

APPENDIX C
EPA REGION 9 PRELIMINARY REMEDIAL GOALS

10:START-2\02010007\S732